REMARKS

Reconsideration of the rejection of Claims 36-40 in the final Office Action of February 9, 2006 is requested in view of the above amendment and the following remarks.

Claims 1-35 were previously canceled and Claims 36-40 remain in the application.

Claims 36, 37, 38, and 40 have been amended to clarify the claims and to place the claims in better form for allowance. No subject matter has been surrendered and the scope of the claims has not been narrowed by the amendments.

Support for the amended claims is found in the original Claims 1-35; at p. 8, paragraph [0026]; and in Examples 1-8 at pp. 12-17 of the Specification.

Rejection of Claims 36, 37, and 39 under 35 U.S.C. 103(a)

Claims 36, 37, and 39 have been rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 5,536,302 to T. C. Golden et al. ("Golden") in view of Japanese Patent Publication JP 02184340 A.

Golden discloses an adsorbent and process for removing trace oxygen from an inert gas. The adsorbent comprises a porous reducing support, such as; activated carbon, carbon black, coal, petroleum coke and titania, which is impregnated with about 10% to about 90% by weight of an alkali metal oxide or an alkaline earth metal oxide. The metals in the metal oxides are specifically disclosed as sodium, potassium, cesium, and barium.

JP 02184340 A discloses a pretreating agent for removing catalytic poisons such as gaseous organometallic compounds, silicon compounds, and organophosphorous compounds from exhaust gas. The pretreating agent is activated manganese oxide on activated alumina. JP 02184340 A is completely silent regarding the removal of contaminant oxygen from any gas.

The claimed embodiments are directed to a process for removing contaminant oxygen from a hydride gas by contacting the hydride gas with a reduced metal oxide carried on a porous support, wherein the reduced metal oxide carried on the porous support is selected from the group consisting of manganese oxide impregnated on porous carbon, manganese oxide impregnated on porous activated alumina, an alkali metal oxide impregnated on porous activated alumina, and an alkaline earth metal oxide impregnated on porous activated alumina. In a specific embodiment, the alkali metal may be selected from the group consisting of cesium, potassium and sodium. In another specific embodiment, the metal oxide is manganese oxide and the manganese oxide is impregnated on activated alumina.

The claimed embodiments differ from Golden because the claimed embodiments are methods to remove oxygen from a hydride gas but, in contrast, Golden's method is for the removal of oxygen from an inert gas. In addition, Golden's adsorbent for removing the oxygen is specifically disclosed as metal oxides comprising sodium, potassium, cesium, and/or barium impregnated on a porous reducing support, such as; activated carbon, carbon black, coal, petroleum coke and titania. In contrast, the claimed adsorbent for removing the oxygen is selected from the group consisting of manganese oxide impregnated on porous carbon, manganese oxide impregnated on porous activated alumina, an alkali metal oxide impregnated on porous activated alumina, and an alkaline earth metal oxide impregnated on porous activated alumina. Thus Golden's adsorbents are all different than the claimed adsorbents, and Golden gives no suggestion that the claimed adsorbents can be used to remove oxygen from a hydride gas.

The claimed embodiments differ from JP 02184340 A because the claimed embodiments remove oxygen from a hydride gas but, in contrast, JP 02184340 A removes gaseous organometallic compounds, silicon compounds, and organophosphorous compounds from exhaust gas. The claimed embodiments thus remove a different contaminant from a different gas than the contaminants and gas disclosed by JP 02184340 A.

A person skilled in the gas purification art would understand that the process disclosed by JP 02184340 A utilizes the activated manganese oxide as a catalyst to promote the reaction of oxygen in the hot, oxygen-containing exhaust gas with the contaminants therein to form oxidation products that are not catalytic poisons. The skilled person thus would understand that the process of JP 02184340 A utilizes a catalyst to **transfer oxygen in the gas phase** but, in distinct contrast, the claimed method utilizes an adsorbent to **remove oxygen from the gas phase**. The disclosure of JP 02184340 A clearly teaches away from the claimed embodiments by disclosing a process which promotes oxidation in the gas phase rather than removing oxygen from the gas phase as claimed.

The person skilled in the gas purification art also would understand that the process disclosed by JP 02184340 A requires that the activated manganese oxide must be fully oxidized in order to function as a catalyst to promote the reaction of oxygen in the hot, oxygen-containing exhaust gas with the contaminants therein. This clearly teaches away from the claimed embodiments, wherein the adsorbent is a reduced metal oxide. Because the catalyst of JP 02184340 A is in contact with hot, oxygen-containing exhaust gas, it would be impossible for the catalyst to be a reduced metal oxide as claimed.

For these reasons, Applicants submit that JP 02184340 A is a deficient reference for use in judging the patentability of the claimed embodiments.

Golden discloses an adsorption process for removing oxygen from an inert gas. This differs significantly from the process of JP 02184340 A, which discloses a catalyst to promote the reaction of oxygen in the hot, oxygen-containing exhaust gas with the contaminants therein to form oxidation products that are not catalytic poisons. Thus, Golden removes oxygen from the gas phase, while JP 02184340 A does not remove oxygen from the gas phase; instead, JP 02184340 A utilizes the oxygen in a gas-phase reaction. Because of the diametrically-opposed objectives of Golden and JP 02184340 A regarding the oxygen in the gas phase, the skilled person would find no motivation therein to combine the two disclosures. Further, the skilled person would understand that Golden's gas phase is an inert gas, but the gas

phase in JP 02184340 A is exhaust gas, which is a hot, highly-reactive oxidizing gas. Because of the significant difference between Golden's gas phase and that of JP 02184340 A, the skilled person would find no motivation therein to combine the two references in seeking a method to remove oxygen from a hydride gas as claimed.

Because JP 02184340 A is a deficient reference and because the skilled person would have no motivation to combine Golden with JP 02184340 A, Applicants respectfully submit that the Examiner has not established that Claims 36, 37, and 39 are unpatentable under 35 U.S.C. 103(a) over Golden in view of JP 02184340 A. It is therefore requested that the rejection be withdrawn.

Rejection of Claims 38 and 40 under 35 U.S.C. 103(a)

Claims 38 and 40 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Golden taken together with JP 02184340 A in view of U.S. Patent Publication 2002/0034467 A1 of K. Otsuka et al. ("Otsuka").

The disclosures of Golden and JP 02184340 A are summarized above.

Otsuka discloses a process for purifying ammonia which comprises contacting crude ammonia with a catalyst comprising manganese oxide to remove oxygen and/or carbon dioxide impurities in the ammonia. This purification step may be followed by another step in which the ammonia is contacted with a synthetic zeolite to remove at least one impurity selected from oxygen, carbon dioxide, and water contained in the crude ammonia. The manganese oxide catalyst is in the form of a molded product made by means of extrusion molding, tabletting molding, or the like, which may be used in the molded form or crushed into a proper size as required (p. 4, paragraph [0042]). The manganese oxide is mixed with a binder to enhance the moldability and strength of the catalyst (p. 4, paragraph [0038]).

The embodiments of Claims 38 and 40 include the use of a desiccant to remove any water that may be formed in the oxygen removal step of Claim 36.

The embodiments of Claims 38 and 40 differ from the disclosures of Golden and JP 02184340 A as described above regarding Claim 36. In addition, Golden and JP 02184340 A are silent regarding the use of a desiccant to remove any water that may be formed in the oxygen removal step as claimed.

Because Claims 38 and 40 include all of the features of Claim 36 from which they depend, the arguments presented above regarding the disclosures of Golden and JP 02184340 A also apply to Claims 38 and 40. These arguments submit that (1) JP 02184340 teaches away from the claimed embodiments and therefore is a deficient reference for judging the patentability of Claims 38 and 40 and (2) because of significant differences between the disclosures of Golden and JP 02184340 A, the skilled person would have no motivation to combine these disclosures.

The claimed embodiments of Claims 38 and 40 differ from Otsuka, because the present invention's reduced metal oxide, as claimed, is impregnated on a **porous support** but, in contrast, Otsuka's catalyst is a reduced metal oxide in the form of **extrudates, tablets, or crushed particles** and does not have a porous support. There is no suggestion in Otsuka that the catalyst can be in the form of a reduced metal oxide on a **porous support**, as claimed.

The Examiner suggests that it would have been obvious to someone of ordinary skill in the art at the time of the invention to provide a desiccant as disclosed by Otsuka together with the reduced metal oxide of Golden taken together with JP 02184340 A to provide for a mechanism for removing water generated during the step of removing oxygen. Applicants disagree with this suggestion for the following reasons:

(1) the skilled person would have would have no motivation to combine the disclosures Golden and JP 02184340 A for the reasons stated above;

(2) JP 02184340 A is a deficient reference for use in judging the patentability of the claimed embodiments for the reasons stated above; and

(3) neither JP 02184340 A nor Otsuka disclose the use of a reduced metal oxide impregnated on a porous support.

In addition, Golden and Otsuka have the common objective of removing oxygen from a gas, but JP 02184340 A has a different objective, namely, to utilize oxygen in the gas phase to oxidize contaminants therein. Further, Golden's gas is an inert gas, but the gas treated by JP 02184340 A (hot exhaust gas) and Otsuka (ammonia) are reactive gases. Based on these differences, the skilled person would have no motivation to combine the three disclosures to arrive at the use of a desiccant to remove water that may be formed in an oxygen removal step utilizing a reduced metal oxide impregnated on a porous support as claimed.

Applicants refer to the results of Examples 1 and 2 in which they compare: (i) the adsorption of oxygen by manganese oxide **supported** on porous activated carbon; with, (ii) the adsorption of oxygen on an **unsupported** manganese oxide catalyst, i.e., the catalyst disclosed by Otsuka. The results of Examples 1 and 2, as summarized in Table 2 at p. 14, show that the **supported** MnO adsorbent of the present invention has a significantly higher O_2 capacity, based on the total weight of Mn available, when compared with the **unsupported** Mn catalyst. The results of Example 3 indicate that the oxygen adsorption capacity of manganese oxide impregnated on porous activated alumina is **4.6 times higher** that the oxygen adsorption capacity of bulk manganese oxide. These **unexpected results rebut** the Examiner's allegation that Claims 38 and 40 are obvious under 35 U.S.C. 103(a) over Golden taken together with JP 02184340 A in view of Otsuka. This is factual evidence of record in the present case, which can only be rebutted by evidence of a comparable significance and not mere allegations.

For the reasons given above, it is respectfully submitted that the Examiner has not established that Claims 38 and 40 are unpatentable under 35 U.S.C. 103(a) over Golden taken together with JP 02184340 A in view of Otsuka. It is therefore requested that the rejection be withdrawn.

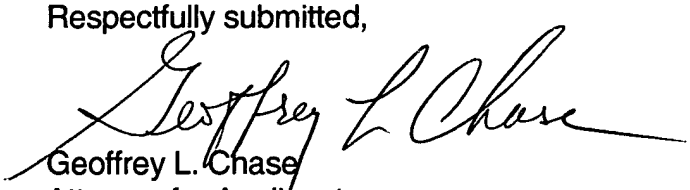
Summary

Based on the new arguments presented above, Applicants submit that Claims 36-40 as amended are patentable over the cited prior art. They request that the Examiner withdraw the rejection of Claims 36, 37, and 39 under 35 U.S.C. 103(a) as being unpatentable over Golden in view of JP 02184340 A and the rejection of Claims 38 and 40 under 35 U.S.C. 103(a) as being unpatentable over Golden taken together with JP 02184340 A in view of Otsuka.

Amendments to the Specification and Abstract will be made as needed when the final claims are allowed so that the descriptive matter is in harmony with the claims as allowed (MPEP 1302.01).

Applicant has separately requested a Request for Continued Examination (RCE) for full consideration of this Amendment.

Respectfully submitted,



Geoffrey L. Chase
Attorney for Applicants
Registration No. 28,059
7201 Hamilton Boulevard
Allentown, PA 18195-1501

(610) 481-7265

us6387 amd after final